Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the instant application:

Listing of Claims:

1. (Currently Amended) A method of building a model for a physical plant in the presence of noise comprising:

(a) initializing the model of the physical plant, wherein the model is characterized by a parameter vector;

(b) estimating an output[[s]] using the model;

(c) computing a composite cost comprising a weighted average of a squared error between the estimated output from the model and an actual output of the physical plant, and a squared derivative of the error, wherein a cost function defined by $J(\mathbf{w}) = E(\hat{e}_k^2) + \beta E(\hat{\dot{e}}_k^2)$ is used to compute the error;

(d) determining a step-size and a model update direction; and

(e) updating the model of the physical plant, wherein said updating step is dependent upon the step size.

2. (Cancelled)

3. (Cancelled)

4. (Currently Amended) The method of claim 1, wherein the parameter vector is represented as $\mathbf{w}_k$, ~~said step (a)~~ and further comprising:

setting the parameter vector $\mathbf{w}_k$ to an initial set of values at said step (a);

bounding the step size η by $0 < \eta < \frac{2\left|E(\hat{e}_k^2 - 0.5\hat{\dot{e}}_k^2)\right|}{E\left[\left\|\hat{e}_k\hat{\mathbf{x}}_k - 0.5\hat{\dot{e}}_k\hat{\dot{\mathbf{x}}}_k\right\|^2\right]}$ after step (d); and

setting a lag value to be greater than or equal to a number of parameters in a physical system including the physical plant.

5. (Currently Amended) The method of claim 1, said step (a) further comprising setting a value of β ~~value~~ in the cost function to be substantially equal to -0.5.

6. (Cancelled)

7. (Currently Amended) The method of claim 1, wherein the parameter vector is represented as $\mathbf{w}_k$, and wherein said step (e) further ~~comprising~~ comprises updating the parameter vector according to $\mathbf{w}_{k+1} = \mathbf{w}_k + \eta sign(\hat{e}_k^2 + \beta\hat{\dot{e}}_k^2)(\hat{e}_k\hat{\mathbf{x}}_k + \beta\hat{\dot{e}}_k\hat{\dot{\mathbf{x}}}_k)$.

8. (Currently Amended) A computer-based system for building a model for a physical plant in the presence of noise, the system comprising:

computer hardware elements that are configured to execute

(a) means for initializing the model of the physical plant, wherein the model is characterized by a parameter vector;

(b) means for estimating an output[[s]] using the model;

(c) means for computing a composite cost comprising a weighted average of a squared error between the estimated output from the model and an actual output of the physical plant, and a squared derivative of the error, wherein said means for computing a composite cost is configured to use a cost function defined by $J(\mathbf{w}) = E(\hat{e}_k^2) + \beta E(\hat{\dot{e}}_k^2)$ in computing the error;

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(d) means for determining a step size and a model direction; and

(f) means for updating the model of the physical plant, wherein operation of the updating means is dependent upon the step size.

9. (Cancelled)

10. (Cancelled)

11. (Currently Amended) The system of claim 8, <u>wherein the parameter vector is represented as</u> $\mathbf{w}_k$, ~~said means (a)~~ <u>and</u> further comprising:

means for setting the parameter vector $\mathbf{w}_k$ to an initial set of values;

means for bounding the step size η by $0 < \eta < \dfrac{2\left|E(\hat{e}_k^2 - 0.5\hat{\hat{e}}_k^2)\right|}{E\left[\left\|\hat{e}_k\hat{\mathbf{x}}_k - 0.5\hat{\hat{e}}_k\hat{\hat{\mathbf{x}}}_k\right\|^2\right]}$; and

means for setting a lag value to be greater than or equal to a number of parameters in a physical system including the physical plant.

12. (Currently Amended) The system of claim 8, said means (a) further comprising means for setting a <u>value of</u> β ~~value~~ <u>in the cost function</u> to be equal to -0.5.

13. (Cancelled)

14. (Currently Amended) The system of claim 8, wherein the parameter vector is represented as $\mathbf{w}_k$, <u>and wherein</u> said means (e) further ~~comprising~~ <u>comprises</u> means for updating the parameter vector according to $\mathbf{w}_{k+1} = \mathbf{w}_k + \eta sign(\hat{e}_k^2 + \beta\hat{\hat{e}}_k^2)(\hat{e}_k\hat{\mathbf{x}}_k + \beta\hat{\hat{e}}_k\hat{\hat{\mathbf{x}}}_k)$.

15. (Currently Amended) A machine readable storage having stored thereon, a computer program having a plurality of code sections, said code sections executable by a machine for causing the machine to build a model of a physical plant in the presence of noise comprising the steps of:

(a) initializing the model of the physical plant, wherein the model is characterized by a parameter vector;

(b) estimating an output[[s]] using the model;

(c) computing a composite cost comprising a weighted average of a squared error between the estimated output from the model and an actual output of the physical plant, and a squared derivative of the error, wherein a cost function defined by $J(\mathbf{w}) = E(\hat{e}_k^2) + \beta E(\dot{\hat{e}}_k^2)$ is used to compute the error;

(d) determining a step size and a model update direction; and

(e) updating the model of the physical plant, wherein said updating step is dependent upon the step size.

16. (Cancelled)

17. (Cancelled)

18. (Currently Amended) The machine readable storage of claim 15, wherein the parameter vector is represented as $\mathbf{w}_k$, and ~~said step (a)~~ further comprising:

setting the parameter vector $\mathbf{w}_k$ to an initial set of values at said step (a);

bounding the step size η by $0 < \eta < \dfrac{2\left|E(\hat{e}_k^2 - 0.5\dot{\hat{e}}_k^2)\right|}{E\left\|\hat{e}_k\hat{\mathbf{x}}_k - 0.5\dot{\hat{e}}_k\dot{\hat{\mathbf{x}}}_k\right\|^2}$ and

setting a lag value to be greater than or equal to a number of parameters in the physical system.

19. (Currently Amended) The machine readable storage of claim 15, said step (a) further comprising setting a value of β ~~value~~ in the cost function to be substantially equal to -0.5.

20. (Cancelled)

21. (Currently Amended) The machine readable storage of claim 15, wherein the parameter vector is represented as $\mathbf{w}_k$, and wherein said step (e) further ~~comprising~~ comprises updating the parameter vector according to $\mathbf{w}_{k+1} = \mathbf{w}_k + \eta sign(\hat{e}_k^2 + \beta\hat{\hat{e}}_k^2)(\hat{e}_k\hat{\mathbf{x}}_k + \beta\hat{\hat{e}}_k\hat{\hat{\mathbf{x}}}_k)$.

22.-57. (Cancelled)

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